

App. No. 10/001,280
Amendment Dated: January 26, 2006
Reply to Office Action of September 26, 2005

Amendments to the Claims:

1 (currently amended): A computerized system comprising:
a processing unit;
a system memory coupled to the processing unit through a system bus;
a computer-readable medium coupled to the processing unit through a system bus;
a hierarchical intermediate representation for a heterogeneous program in the system memory;
a transformation process that is configured to execute ~~executing~~ in the processing unit for and that is configured to modify ~~modifying~~ the hierarchical intermediate representation to create a modified intermediate representation associated with the heterogeneous program;
a dynamic modification process that is configured to execute ~~executing~~ in the processing unit; and
an application program interface that is configured to be executed from the computer-readable medium by the processing unit, wherein the dynamic modification process is configured to call ~~calls~~ the application program interface to cause the processing unit to modify the system memory associated with the heterogeneous program running in the system memory based on the modified intermediate representation.

2 (currently amended): The computerized system of Claim 1, wherein the dynamic modification process is further configured to call ~~calls~~ the application program interface to cause the processing unit to suspend processing of other programs executing in the system memory.

3 (currently amended): The computerized system of Claim 1, wherein the dynamic modification process is further configured to call ~~calls~~ the application program interface to cause the processing unit to resume processing of the other programs executing in the system memory.

4 (currently amended): The computerized system of Claim 1, wherein modifying the system memory associated with the heterogeneous program causes the processing unit to change execution flow of the heterogeneous program.

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5 (currently amended): The computerized system of Claim 1, wherein the heterogeneous program is configured to execute ~~executing~~ on a remote computing device with a remote system memory, the dynamic modification process calls the application program interface to cause a remote processing unit to modify the remote system memory.

6 (currently amended): The computerized system of Claim 5, wherein the dynamic modification process is further configured to call ~~further calls~~ the application program interface to cause the remote processing unit to suspend processing of other running programs running in the remote system memory.

7 (currently amended): The computerized system of Claim 5, wherein the dynamic modification process is further configured to call ~~further calls~~ the application program interface to cause the remote processing unit to resume processing of the other programs running in the remote system memory.

8 (original): An application program interface embodied on a computer-readable medium for execution on a computer in conjunction with a hierarchical intermediate representation of a heterogeneous program, the application program interface comprising:
a navigation function that returns program information for a specified computing device;
a query function that returns information about a program on the specified computing device;
a thread management function for controlling execution of other programs on the specified computing device; and
a modifier function for modifying the heterogeneous program residing in a system memory on the specified computing device.

9 (original): The application program interface of Claim 8, wherein the navigation function includes:
a first program function that returns a first program on the specified computing device.

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10 (original): The application program interface of Claim 8, wherein the query function includes a counting function that returns a number representing a count of programs executing on the specified computing device.

11 (original): The application program interface of Claim 8, wherein the thread management function includes:

a suspend function that suspends other programs from executing on the specified computing device; and

a resume function that resumes the execution of the other programs on the specified computing device.

12 (original): The application program interface of Claim 8, wherein the modifier function includes a patch function that overwrites a portion of the system memory originally storing part of the heterogeneous program with a new binary code for the heterogeneous program.

13 (original): The application program interface of Claim 8, wherein the modifier function includes an injector function that writes a new binary code in a portion of the system memory that did not originally store an original binary code for the heterogeneous program, and that writes a jump instruction in a first location of the system memory that stored the original binary code, the new binary code being a modification to the original binary code and the jump instruction transferring execution to the new binary code.

14 (original): The application program interface of Claim 8, wherein the specified computing device is a remote computing device.

15 (original): An application program interface embodied on a computer-readable medium for execution on a computer, the application program interface comprising:

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a first set of functions for creating a hierarchical internal representation of a heterogeneous program and for modifying the hierarchical internal representation to create a modified internal representation; and

a second set of functions for dynamically modifying a system memory in which the heterogeneous program is executing, the system memory being modified based on the modified internal representation of the heterogeneous program.

16 (original): The application program interface of Claim 15, wherein the second set further includes functions for controlling processing of other programs executing in the system memory.

17 (original): The application program interface of Claim 15, wherein the second set further includes functions for changing an execution flow of the heterogeneous program.

18 (original): The application program interface of Claim 15, further comprising a third set of functions for modifying a remote system memory if the heterogeneous program is executing in a remote system memory on a remote computer.

19 (original): A computer-readable medium having computer-executable instructions stored thereon to provide an interface to a hierarchical intermediate representation of a heterogeneous program comprising:

an instruction application interface exposed by an instruction element in the hierarchy for navigating, querying, modifying, translating, and committing an instruction in the intermediate representation;

a block application interface exposed by a block element in the hierarchy for navigating, querying, modifying, and committing a block in the intermediate representation;

a procedure application interface exposed by a procedure element in the hierarchy for navigating, querying, modifying, and committing a procedure in the intermediate representation;

a program application interface exposed by a program element in the hierarchy for modifying and querying the intermediate representation for the heterogeneous program; and

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a system application interface exposed by a system element in the hierarchy for determining the program element available on a computing device.

20 (original): The computer-readable medium of Claim 1, further comprising a remote application interface for determining the program element when the computing device is a remote computing device.